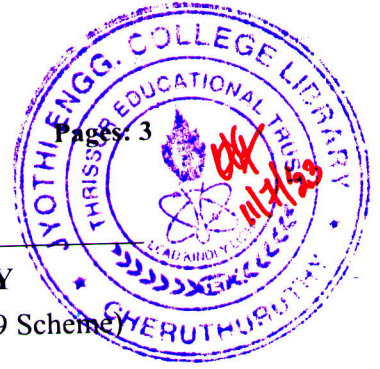0300CST304052203

Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S6 (R, S) / S4 (PT) (R, S) Examination June 2023 (2019 Scheme)

Course Code: CST304

Course Name: COMPUTER GRAPHICS AND IMAGE PROCESSING

Max. Marks: 100   Duration: 3 Hours

PART A

Answer all questions, each carries 3 marks.   Marks

1	Differentiate the aspect ratio and resolution of a raster scan display?	(3)
2	List out the applications of computer graphics.	(3)
3	Write down the 4- neighbour Flood-filling algorithm	(3)
4	Describe the basic 3-Dimension transformations	(3)
5	Discuss the steps involved in window to viewport coordinate transformation in 2D?	(3)
6	Illustrate the Oblique Projections	(3)
7	Define the terms related to pixel of an image: i) Neighbours ii) Boundary iii) Path	(3)
8	Differentiate gray scale image and a colour image	(3)
9	Write the algorithm for basic Global thresholding	(3)
10	Compare Smoothening and sharpening techniques in image processing	(3)

PART B

Answer one full question from each module, each carries 14 marks.

Module I

11	a)	Explain the architecture of raster scan system with suitable diagrams.	(6)
	b)	Rasterize the line segment from pixel coordinate (1, 1) to (8, 5) using Bresenham's line drawing algorithm	(8)

OR

12	a)	Scan convert the line segment with end points (0,0) and (10,5) using DDA line drawing algorithm. Find out and discuss the advantages and disadvantages of this method.	(10)

b) Describe the working of a beam penetration CRT (4)

Module II

13 a) Compare the purpose of flood-fill and boundary-fill algorithm. Discuss the data structures used for scan-line polygon filling algorithm. (8)

b) Given a triangle A(20,10) B(80,20) C(50,70). Find the co-ordinates of vertices when (a) Reflection about the line x=y, (b) Reflection about the diagonal y = -x. (6)

OR

14 a) Consider a triangle at (2,2), (10,2), (2,10). Perform the following 2D transformations in succession and find the resultant vertices (10)

  (i) Scale with respect to (2,2) by scaling factors (2,2) respectively along x and y directions.

  (ii) Rotate by 90^0 counter clockwise direction

b) Discuss the techniques used to identify the inside and outside points of a polygon. (4)

Module III

15 a) Write Cohen Sutherland Algorithm and illustrate the region and region code (8)

b) Summarize on multi view and axonometric projections. Write the equation for projection coordinates of a point P(x,y,z), if the view plane is placed along z-axis. (6)

OR

16 a) Describe the Depth buffer algorithm used for visible surface detection (8)

b) List out the applications of visible surface detection algorithms (6)

Module IV

17 a) Write short notes on (i) Illumination, (ii) Reflectance (6)

b) Describe the components of an image processing system with necessary diagram (8)

OR

18 a) Define convolution. List out the properties of convolution. Illustrate the steps involved in convolving an image with a mask. (8)

b) List out the applications of image processing in Medical field (6)

Module V

19 a) A 3-bit image of size 4×5 is shown below. Compute the histogram equalized (8)

image.

0	1	1	3	4
7	2	5	5	7
6	3	2	1	1
1	4	4	2	1

b) Define edges in an image. Discuss on any two edge filters (6)

OR

20 a) Discuss on region based approaches used for segmentation (8)

b) Describe the Laplacian filter masks used for image processing (6)

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